

## REMARKS

Applicants acknowledge receipt of an Office Action dated January 14, 2003. In this response Applicants have amended claims 21-26. Support for these amendments may be found in the specification *inter alia* at page 2, lines 13-18 and page 11, lines 6-14. Applicants submit that entry of these amendments after final rejection is proper since these amendments obviate the outstanding rejection under 35 U.S.C. § 112, 2<sup>nd</sup> paragraph and correct a typographical error. Following entry of these amendments, claims 21-37 are pending in the application.

Reconsideration of the present application is respectfully requested in view of the foregoing amendments and the remarks which follow.

### **Personal Interview on April 8, 2003**

As an initial matter, Applicants wish to thank Examiner Ip for the courtesies extended to the undersigned during a personal interview conducted on April 8, 2003. During the interview, the outstanding rejections, cited art and the amendments *supra* were discussed. In addition, Examiner Ip noted that claim 25 specified two ranges for the weight percent of titanium in the steel. In this response, Applicants have amended claim 25 to correct this typographical error.

### **Rejections Under 35 U.S.C. § 112, 2<sup>nd</sup> Paragraph**

On page 2 of the Office Action, the PTO has rejected claims 21-26 under 35 U.S.C. § 112, 2<sup>nd</sup> paragraph as allegedly being indefinite. In this response, Applicants have amended each of claims 21-26 to replace the phrase "wherein the heat resistant steel consists essentially of bainite" with the phrase "wherein the heat resistant steel consists of bainite". Support for this amendment may be found, for example, at page 11, lines 12-14, which states that the "heat-resisting steels of the present invention developed only bainite when they were subjected to oil cooling after normalizing heat treatment." Applicants submit that these amendments to claims 21-26 have obviated the outstanding rejection under 35 U.S.C. § 112, 2<sup>nd</sup> paragraph.

In view of the foregoing, Applicants respectfully request reconsideration and withdrawal of the outstanding rejections under 35 U.S.C. § 112, 2<sup>nd</sup> paragraph.

### **Rejections Under 35 U.S.C. § 103**

On page 3 of the Office Action, the PTO has rejected claims 21-29, 31-33 and 35-37 under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent 5,458,703 to Nakai (hereafter "Nakai") or JP 08193240 (hereafter "JP '240") or U.S. Patent 5,972,129 to Beguinot *et al.* (hereafter "Beguinot"). Also on page 3 of the Office Action, the PTO has rejected claims 23, 27 and 37 under 35 U.S.C. § 103(a) as being unpatentable over the JP 8246096 abstract (hereafter "JP '096"). Finally, on page 4 of the Office Action, the PTO rejected claims 30 and 34 under 35 U.S.C. § 103(a) as being unpatentable over the references applied to the claims above and further in view of JP 09041076 (hereafter "JP '076") or JP '076 alone. As discussed *supra*, in this response, Applicants have amended each of independent claims 21-26 to replace the phrase "wherein the heat resistant steel consists essentially of bainite" with the phrase "wherein the heat resistant steel consists of bainite". In view of these amendments, Applicants respectfully traverse the outstanding rejections under 35 U.S.C. § 103 for the reasons set forth below.

To establish *prima facie* obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art. *In re Royka*, 180 USPQ 580 (CCPA 1974). See MPEP § 2143.03. Here, none of the cited references, namely, Nakai, JP '240, Beguinot, JP '096 or JP '076, taken either individually or in combination, teach or properly suggest heat-resisting steel compositions as set forth in each or independent claims 21-26 "wherein the heat resisting steel consists of a bainite single phase". Applicants note the PTO's argument at paragraphs 14 and 21 of the Office Action. In these paragraphs, the PTO contends that the expression "consisting essentially of" allows other phases [than bainite] to be present. Applicants respectfully request, that the PTO now reconsider the outstanding rejections in view of the foregoing amendments to independent claims 21-26.

Even if the PTO were to have established a proper *prima facie* case of obviousness (and Applicants do not concede that the PTO has done so here), such a

case can be rebutted by evidence of secondary considerations such as unexpected results. Such evidence includes comparative data in the specification which is intended to illustrate the claimed invention. See MPEP §2141 and MPEP §716.01(a). This is also true in instances where claimed ranges overlap or lie within ranges disclosed in the prior art. See MPEP §2141.05. Here, Applicants have provided comparative data in Tables 1-3 on pages 12-14 of the specification.

With particular regard to Beguinot, Applicants note that comparative examples C1-C9 in the present specification, fall within the composition ranges of Beguinot but outside the presently claimed ranges. With regard to Nakai, Applicants note that comparative examples C1, C3 and C5-C9 fall within the composition of Nakai but outside the presently claimed compositions. With regard to JP '240, Applicants note that comparative example C3 falls within the composition of JP '240 but outside the presently claimed compositions. Finally, with regard to JP '096, Applicants note that comparative example C5 falls within the compositions of JP '096 but outside the presently claimed compositions.

As seen in Table 2 of the present specification, the steels of the claimed embodiments of the present invention exhibit (1) significantly higher times taken before creep rupture and (2) significantly higher impact absorbing energy than the steels of comparative examples C1-C9. Thus, the comparative data in the present specification demonstrates that the presently claimed steels exhibit an unexpected result as compared to the steels of Beguinot, Nakai, JP '240 and JP '096.

In addition, Applicants submit that none of the disclosures of Beguinot, Nakai, JP '240 or JP '096, taken either individually or in combination, teach or properly suggest that the presently claimed compositions will exhibit the combination of (1) significantly higher times taken before creep rupture and (2) significantly higher impact absorbing energy disclosed in Table 2.

If an independent claim is nonobvious under §103, then any claim depending therefrom is nonobvious. *In re Fine*, 5 USPQ2d 1596 (Fed. Cir. 1988). See MPEP 2143.03. Thus, Applicants submit that claims 27-37, which ultimately depend from one of independent claims 21-26, are also non-obvious.

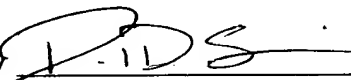
In view of the foregoing, Applicants respectfully request reconsideration and withdrawal of this rejection under §103.

### CONCLUSION

In view of the foregoing amendments and remarks, Applicants respectfully submit that all of the pending claims are now in condition for allowance. An early notice to this effect is earnestly solicited. If there are any questions regarding the application, the Examiner is invited to contact the undersigned at the number below.

Respectfully submitted,

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By 

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**MARKED UP VERSION SHOWING CHANGES MADE**

Below are the marked up amended claim(s):

21. (Twice Amended) A heat-resisting steel consisting essentially of 0.20 (exclusive) - 0.30 wt.% C, 0.05 (exclusive) - 0.30 wt.% Si, 0.01 - 0.7 wt.% Mn, 1.8 - 2.5 wt.% Cr, 0.15 - 0.23 wt.% V, 1.5 - 2.5 wt.% W, 0.01 - 0.02 wt.% Ti, 0.01 - 0.08 wt.% Nb, 0.005 - 0.03 wt.% N, 0.001 - 0.015 wt.% B, and Fe and unavoidable impurities as the remainder, wherein the heat-resisting steel consists **[essentially]** of a bainite single phase.

22. (Twice Amended) A heat-resisting steel consisting essentially of 0.20 (exclusive) - 0.30 wt.% C, 0.05 (exclusive) - 0.30 wt.% Si, 0.01 - 0.7 wt.% Mn, 1.8 - 2.5 wt.% Cr, 1.5 - 2.5 wt.% W, 0.23 (exclusive) - 0.35 wt.% V, 0.02 (exclusive) - 0.03 wt.% Ti, 0.005 - 0.03 wt.% N, 0.001 - 0.015 wt.% B, and Fe and unavoidable impurities as the remainder, wherein the heat-resisting steel consists **[essentially]** of a bainite single phase.

23. (Twice Amended) A heat-resisting steel consisting essentially of 0.20 (exclusive) - 0.30 wt.% C, 0.05 (exclusive) - 0.30 wt.% Si, 0.01 - 0.7 wt.% Mn, 1.8 - 2.5 wt.% Cr, 0.23 (exclusive) - 0.35 wt.% V, 1.5 - 2.5 wt.% W, 0.005 - 0.03 wt.% N, 0.001 - 0.015 wt.% B, and Fe and unavoidable impurities as the remainder, wherein the heat-resisting steel consists **[essentially]** of a bainite single phase.

24. (Twice Amended) A heat-resisting steel consisting essentially of 0.15 - 0.30 wt.% C, 0.05 (exclusive) - 0.30 wt.% Si, 0.01 - 0.7 wt.% Mn, 1.8 - 2.5 wt.% Cr, 0.15 - 0.23 wt.% V, 1.5 - 2.5 wt.% W, 0.3 - 0.8 wt.% Mo, 0.01 - 0.02 wt.% Ti, 0.01 - 0.08 wt.% Nb, 0.005 - 0.03 wt.% N, 0.001 - 0.015 wt.% B, and Fe and unavoidable impurities as the remainder, wherein the heat-resisting steel consists **[essentially]** of a bainite single phase.

25. (Twice Amended) A heat-resisting steel consisting essentially of 0.15 - 0.30 wt.% C, 0.05 (exclusive) - 0.30 wt.% Si, 0.01 - 0.7 wt.% Mn, 1.8 - 2.5 wt.% Cr, 1.5 - 2.5 wt.% W, 0.3 - 0.8 wt.% Mo, **0.01 - 0.02 wt.% Ti**, 0.23 (exclusive) - 0.35 wt.% V, 0.02 (exclusive) - 0.03 wt.% Ti, 0.005 - 0.03 wt.% N, 0.001 - 0.015

wt.% B, and Fe and unavoidable impurities as the remainder, wherein the heat-resisting steel consists [ **ssentially**] of a bainite single phase.

26. (Twice Amended) A heat-resisting steel consisting essentially of 0.15 - 0.30 wt.% C, 0.05 (exclusive) - 0.30 wt.% Si, 0.01 - 0.7 wt.% Mn, 1.8 - 2.5 wt.% Cr, 0.23 (exclusive) - 0.35 wt.% V, 1.5 - 2.5 wt.% W, 0.3 - 0.8 wt. % Mo, 0.005 - 0.03 wt.% N, 0.001 - 0.015 wt.% B, and Fe and unavoidable impurities as the remainder, wherein the heat-resisting steel consists [**essentially**] of a bainite single phase.